

2021 Western Drought & Extreme Heat Assessment

Assessment Period: Aug 23-29, 2021

Publication Date: September 2, 2021

USDA NASS

Disaster Monitoring Team



Outline

- The attached slides provide an overview of the extreme heat and drought conditions in five NASS Regions: Northwest, Pacific, Mountain, Northern Plains, and Upper Midwest.
 - Slides 3-5 illustrate **temperature and precipitation anomalies** for the conterminous U.S. from August 1-31, 2021. This is based on PRISM Climate Group data and 30 years of climatological information.
 - Slides 6-11 illustrate areas impacted by **heat stress** for each region individually for Weeks 33 (Aug 16-22, 2021) & 34 (Aug 23-29, 2021) in 2021, Week 34 in 2020, and the Week 34 five-year average.
 - Slides 12-30 identify the resulting impact of the lack of precipitation and extreme heat on **cropland subsoil moisture**. Weekly average subsoil moisture, anomalies, and categorical levels for Week 34 (Aug 23-29, 2021) are illustrated. The information was obtained from the Crop-CASMA web application. Figures use a crop mask (gray) to block out non-cropland areas. An analysis was conducted to identify the percent of cropland at varying levels with extreme conditions highlighted.

PRISM Climate Group Data

- Offers an "early glimpse" version of precipitation and temperature data from the current month
- The datasets are modeled using climatologically-aided interpolation (CAI), which uses the long-term average pattern (i.e., the 30-year normals) as first-guess of the spatial pattern of climatic conditions for a given month or day
- Data supported by USDA RMA



Map provided by PRISM Climate Group: <https://prism.oregonstate.edu/mtd/>

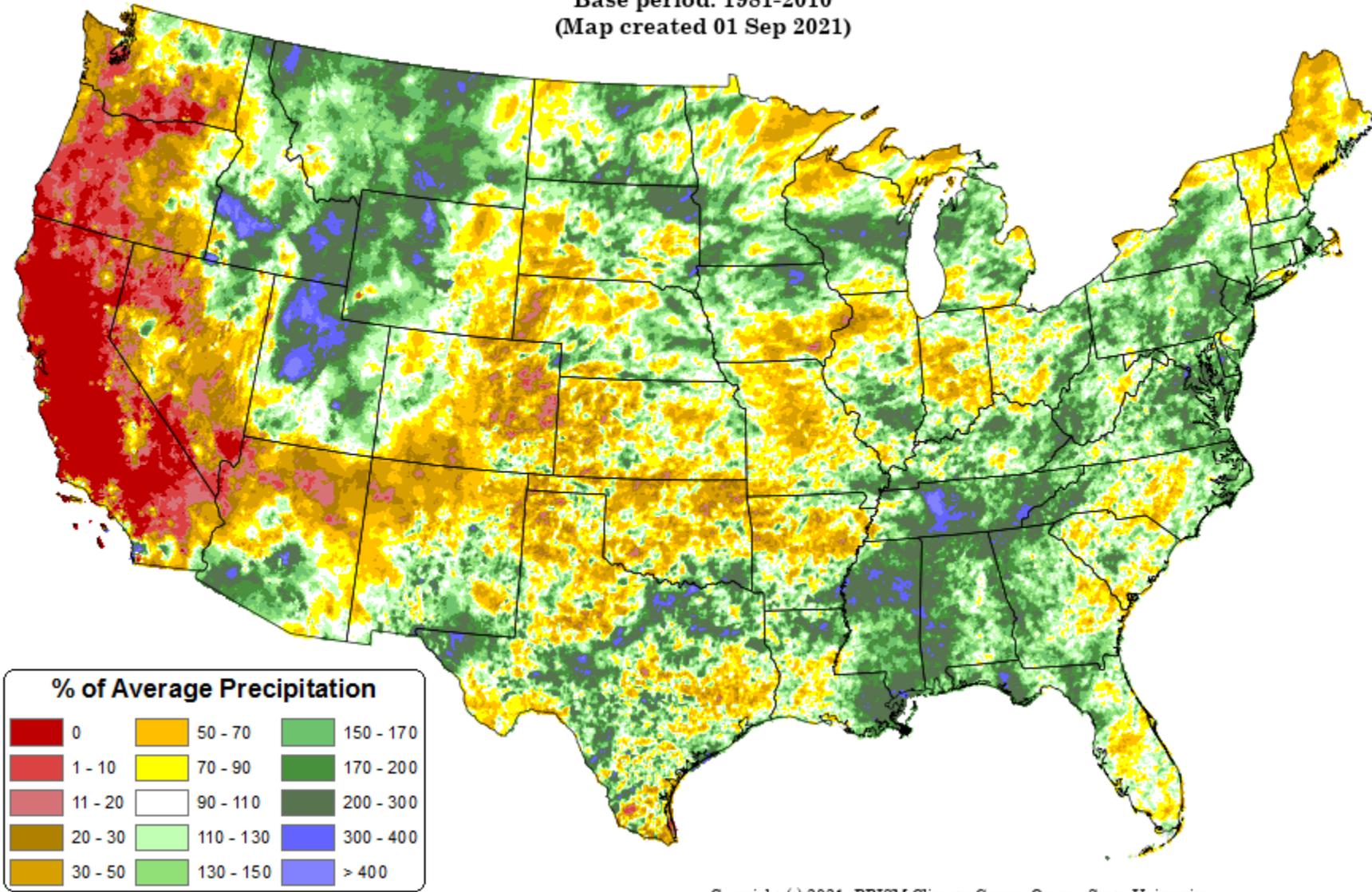


Total Precipitation Anomaly: 01 Aug 2021 - 31 Aug 2021

Period ending 7 AM EST 31 Aug 2021

Base period: 1981-2010

(Map created 01 Sep 2021)



Copyright (c) 2021, PRISM Climate Group, Oregon State University



Map provided by PRISM Climate Group: <https://prism.oregonstate.edu/mtd/>

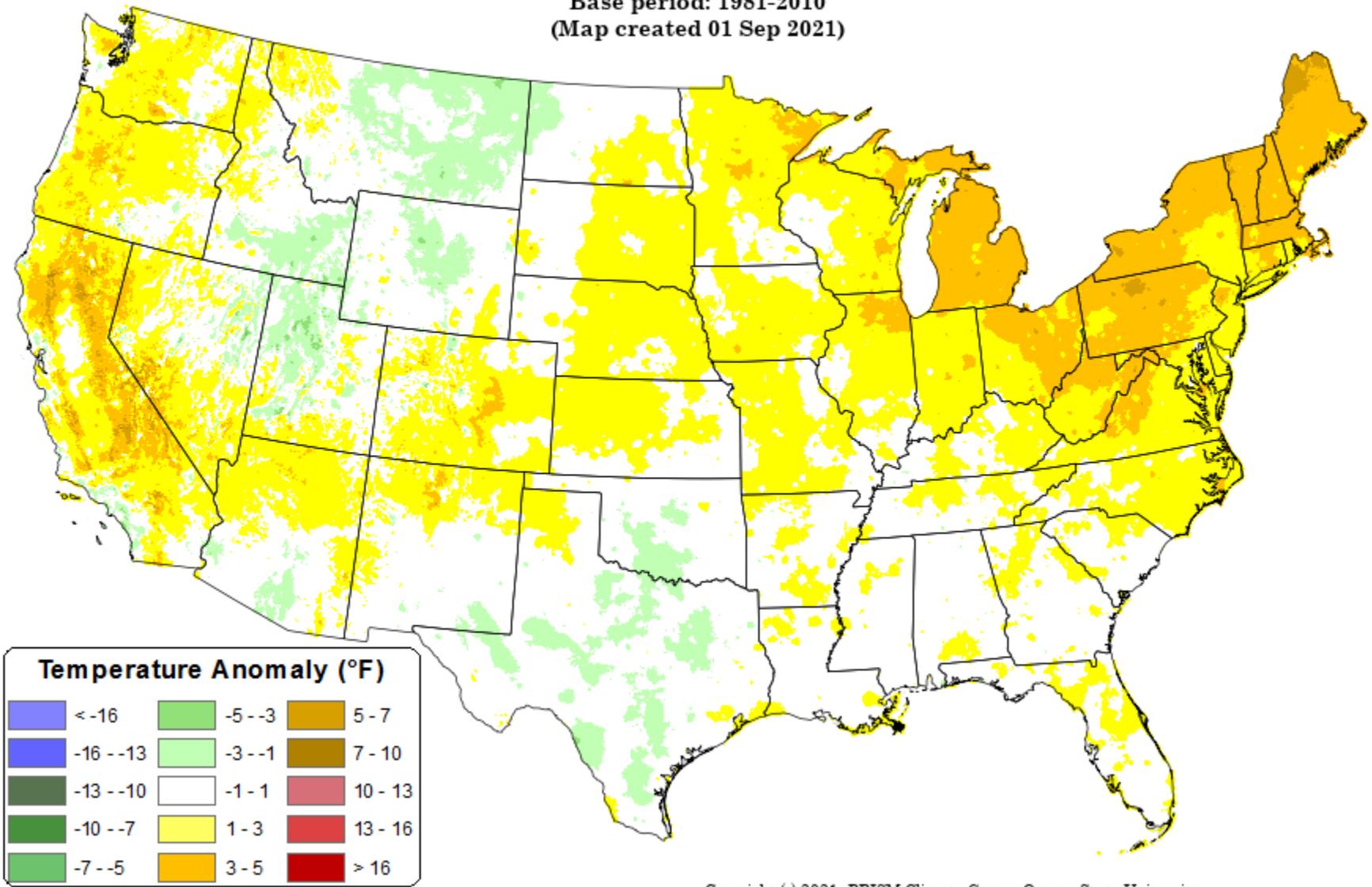


Daily Mean Temperature Anomaly: 01 Aug 2021 - 31 Aug 2021

Period ending 7 AM EST 31 Aug 2021

Base period: 1981-2010

(Map created 01 Sep 2021)



Copyright (c) 2021, PRISM Climate Group, Oregon State University



Map provided by PRISM Climate Group: <https://prism.oregonstate.edu/mtd/>



Heat Stress Data

- Data calculated using data from two main sources of gridded products, PRISM, and RTMA.
- Heat stress is calculated as the difference between the maximum observed temperature during the day and the selected threshold (T_{dth}).

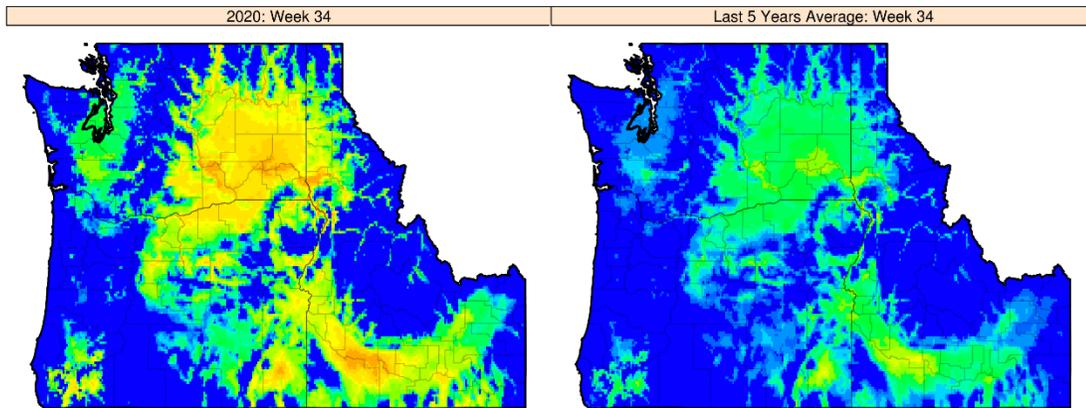
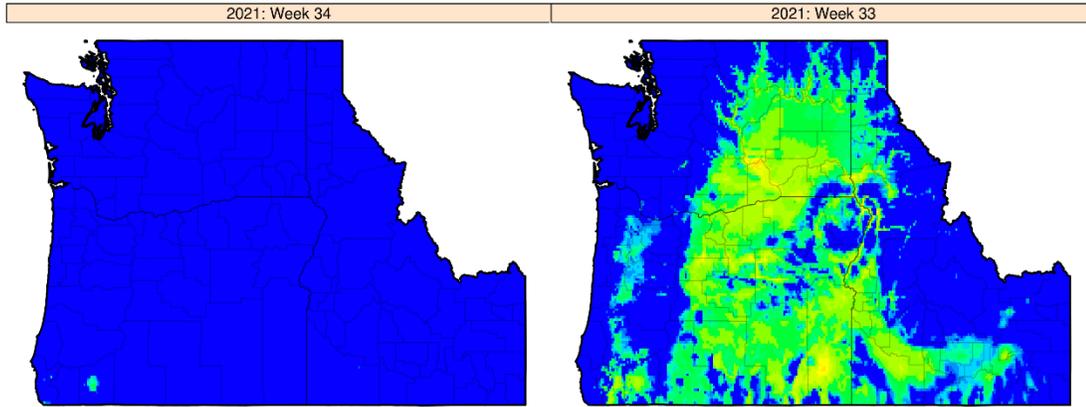
$$HSDD = \begin{cases} (T_{max} - T_{dth}), & \text{if } T_{max} \geq T_{dth} \\ 0, & \text{otherwise} \end{cases}$$



Source: NASS Climate-based Information System



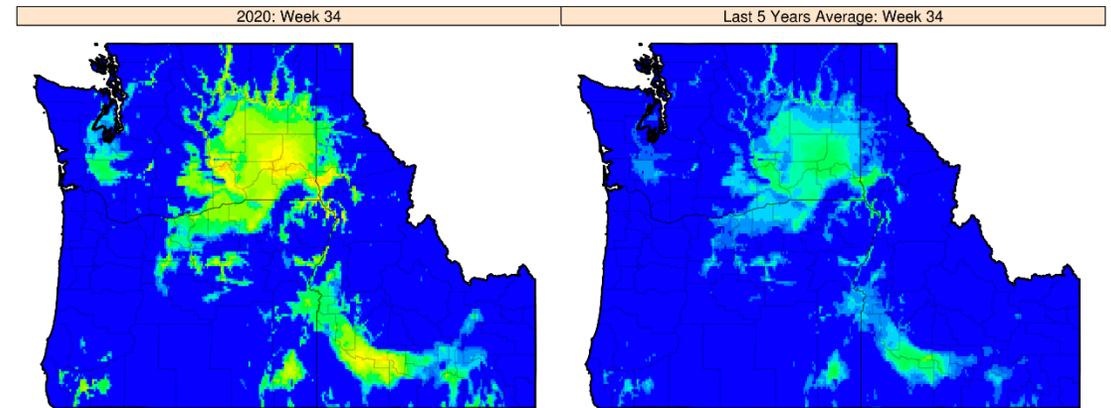
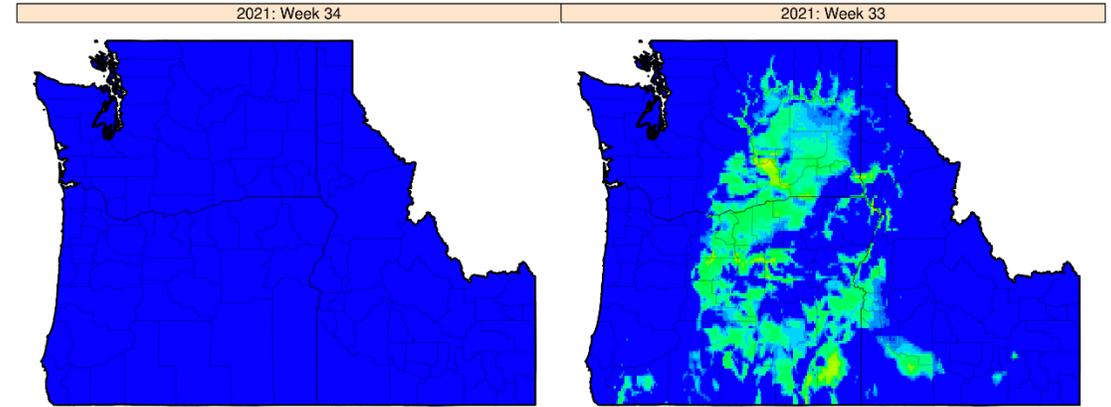
Northwest Region - Heat Index (93°F) - 2021: Week 34
Accumulated Degrees above 93 Degrees



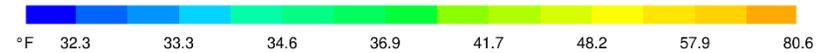
*Does not include Alaska



Northwest Region - Heat Index (97°F) - 2021: Week 34
Accumulated Degrees above 97 Degrees



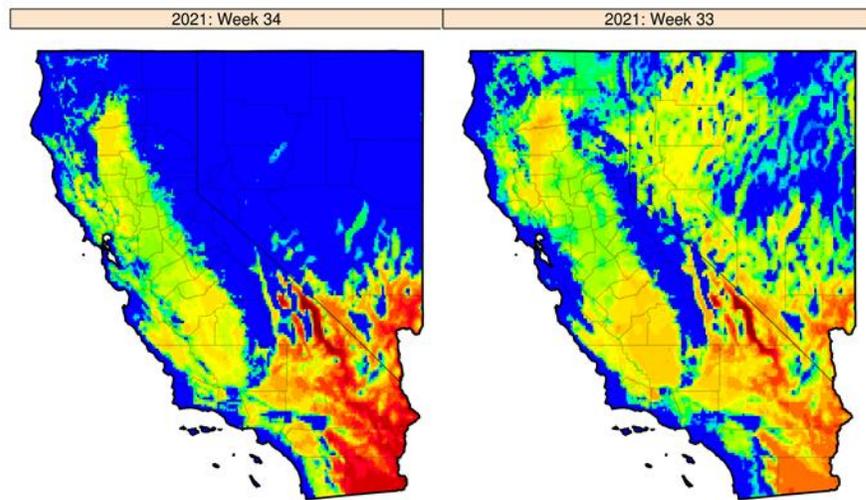
*Does not include Alaska



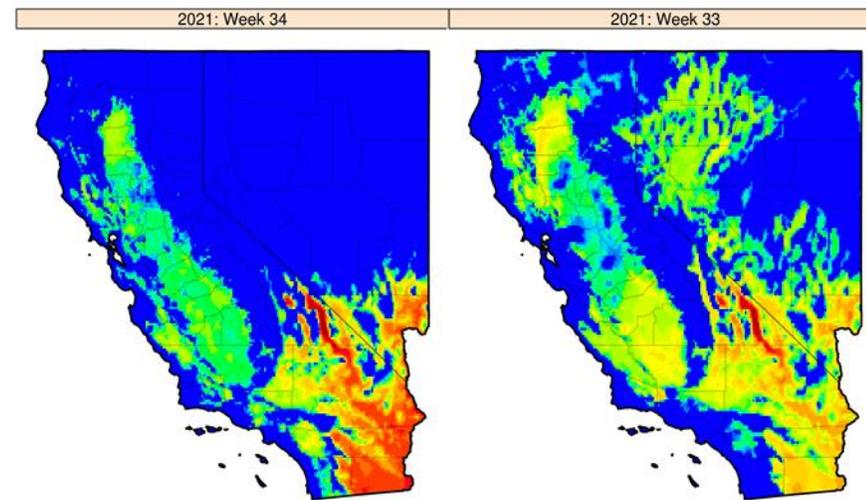
Source: NASS Climate-based Information System



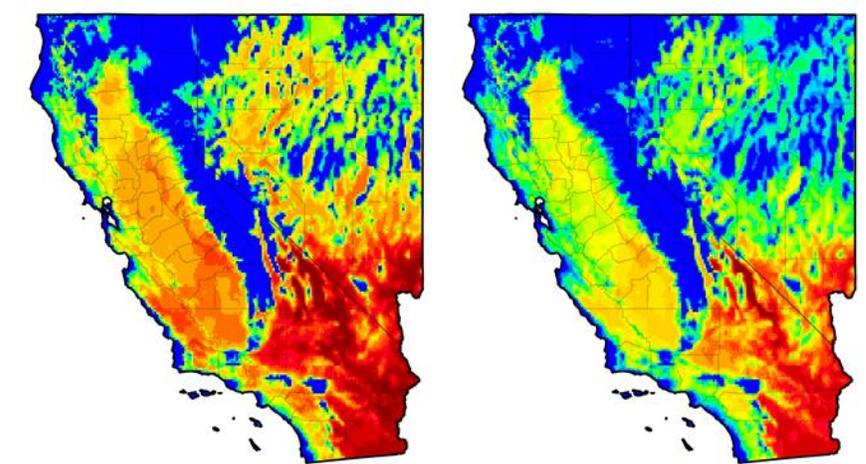
Pacific Region - Heat Index (93°F) - 2021: Week 34
Accumulated Degrees above 93 Degrees



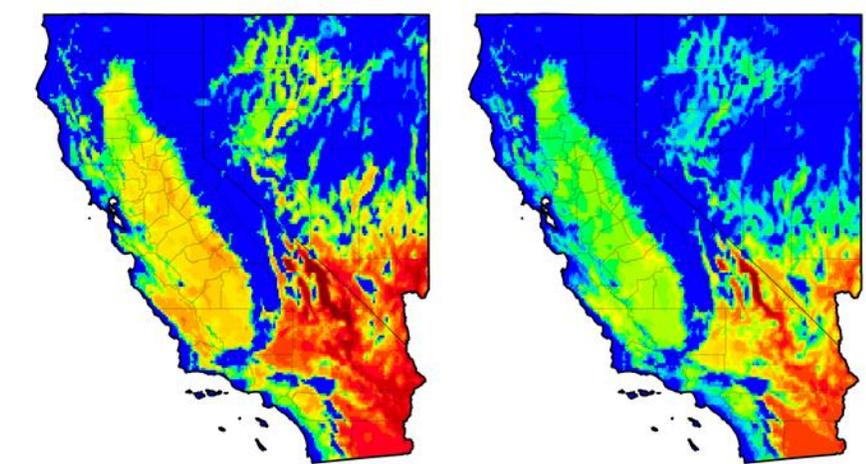
Pacific Region - Heat Index (97°F) - 2021: Week 34
Accumulated Degrees above 97 Degrees



2020: Week 34 Last 5 Years Average: Week 34



2020: Week 34 Last 5 Years Average: Week 34



*Does not include Hawaii

°F 32.3 33.3 34.6 36.9 41.7 48.2 57.9 80.6 113 145.4 356

*Does not include Hawaii

°F 32.3 33.3 34.6 36.9 41.7 48.2 57.9 80.6 113 145.4 356

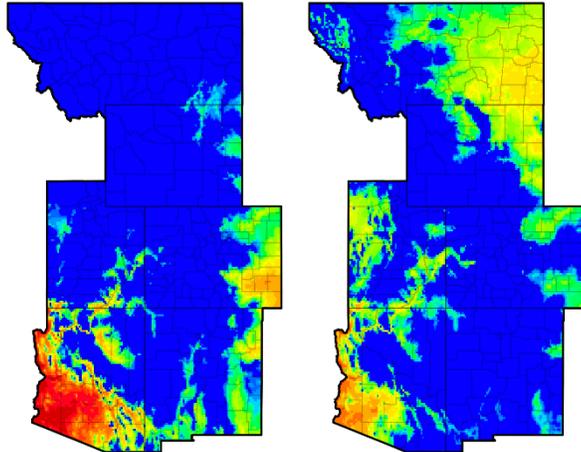


Source: NASS Climate-based Information System

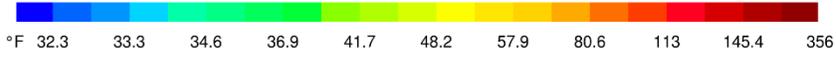
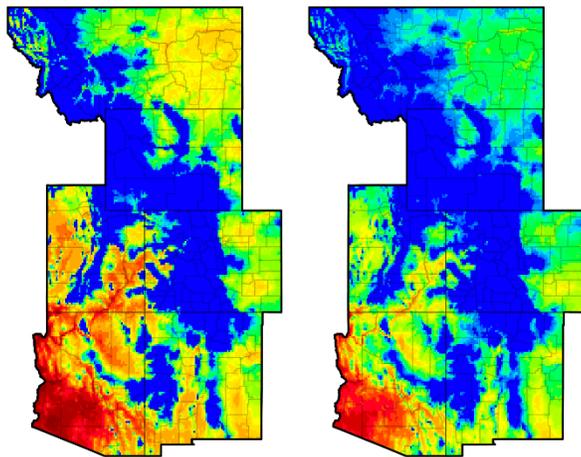


Mountain Region - Heat Index (93°F) - 2021: Week 34 Accumulated Degrees above 93 Degrees

2021: Week 34 2021: Week 33

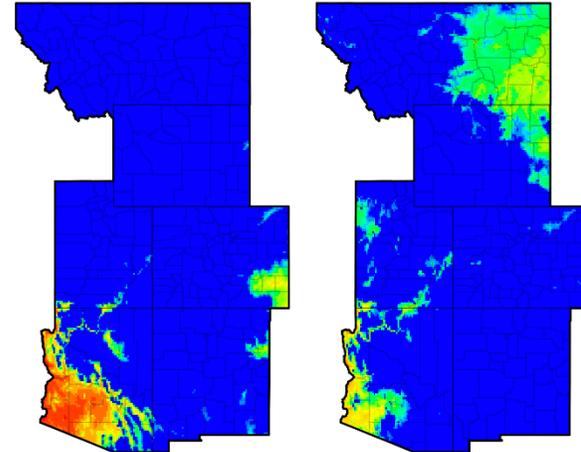


2020: Week 34 Last 5 Years Average: Week 34

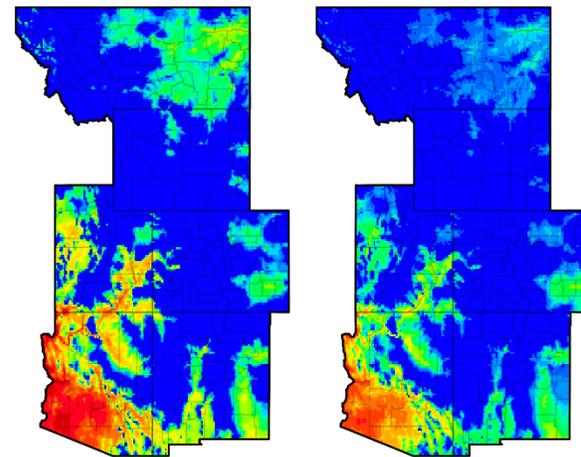


Mountain Region - Heat Index (97°F) - 2021: Week 34 Accumulated Degrees above 97 Degrees

2021: Week 34 2021: Week 33



2020: Week 34 Last 5 Years Average: Week 34

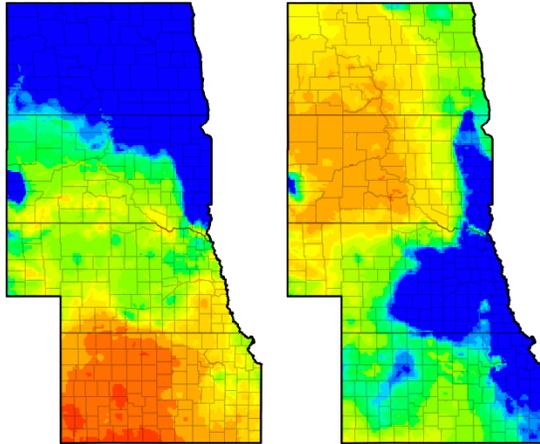


Source: NASS Climate-based Information System

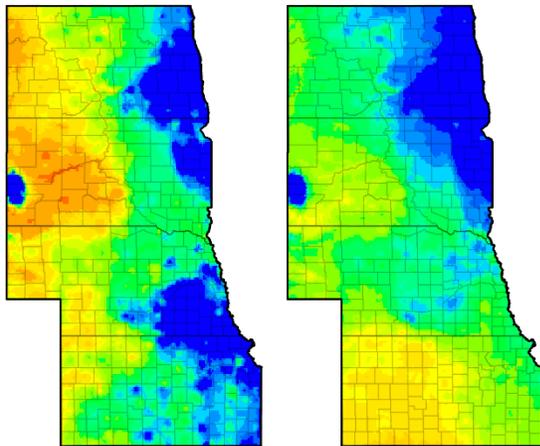


Northern Plains Region - Heat Index (90°F) - 2021: Week 34 Accumulated Degrees above 90 Degrees

2021: Week 34 2021: Week 33

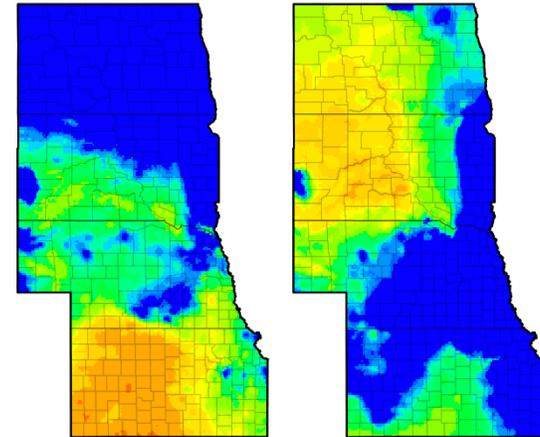


2020: Week 34 Last 5 Years Average: Week 34

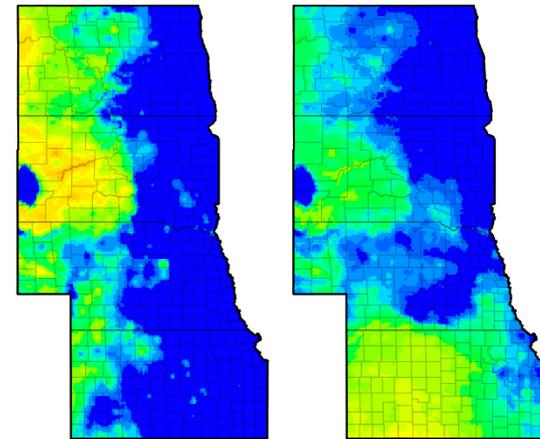


Northern Plains Region - Heat Index (93°F) - 2021: Week 34 Accumulated Degrees above 93 Degrees

2021: Week 34 2021: Week 33



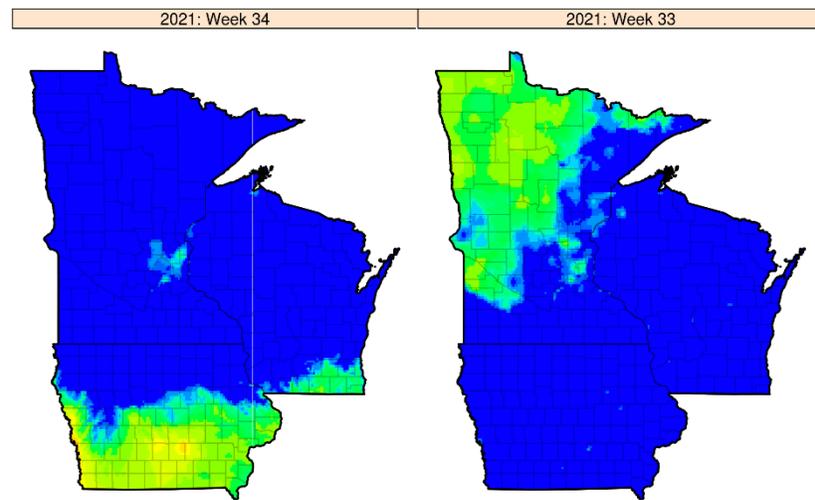
2020: Week 34 Last 5 Years Average: Week 34



Source: NASS Climate-based Information System

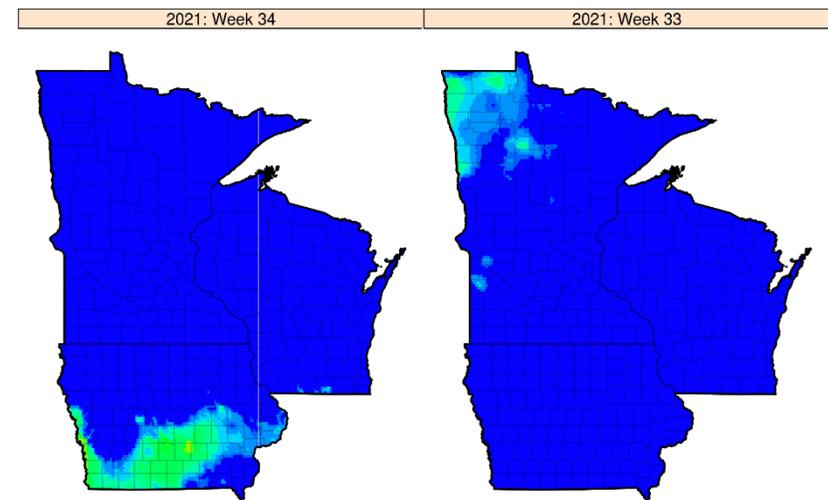


Upper Midwest Region - Heat Index (90°F) - 2021: Week 34 Accumulated Degrees above 90 Degrees

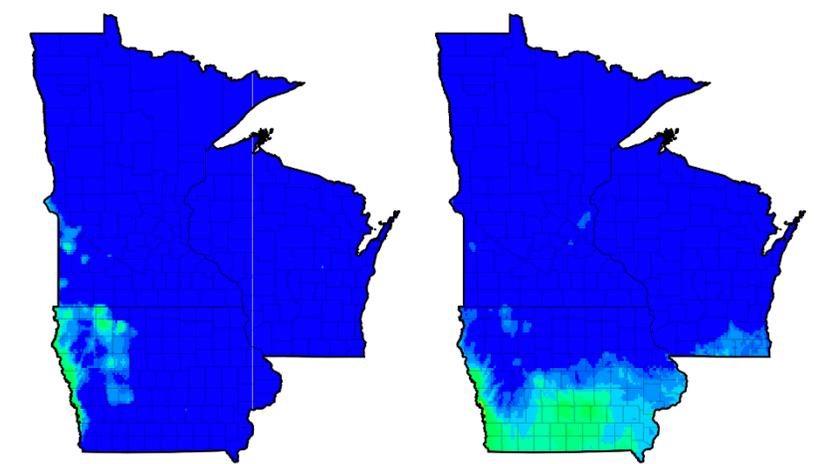


2021: Week 34 2021: Week 33

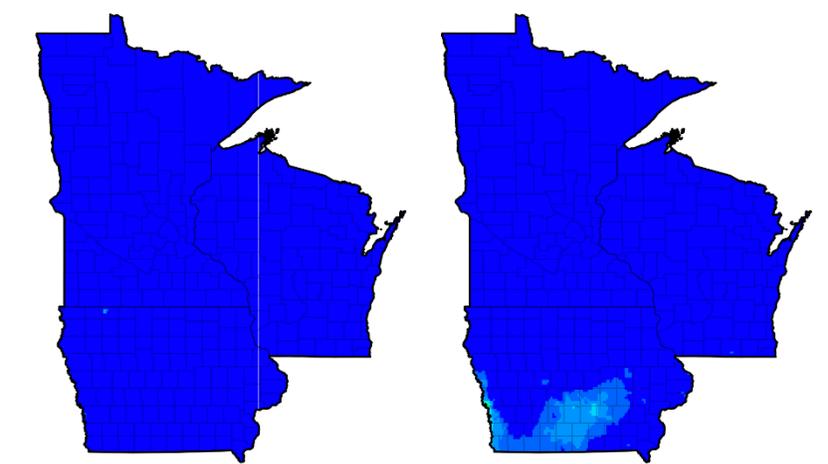
Upper Midwest Region - Heat Index (93°F) - 2021: Week 34 Accumulated Degrees above 93 Degrees



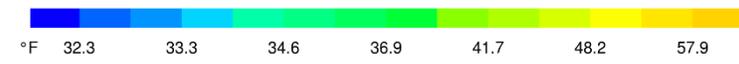
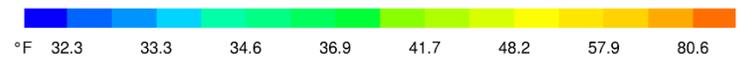
2021: Week 34 2021: Week 33



2020: Week 34 Last 5 Years Average: Week 34



2020: Week 34 Last 5 Years Average: Week 34



Source: NASS Climate-based Information System



Soil Moisture Data

- Hosted by Crop-CASMA (Crop Condition and Soil Moisture Analytics) <https://nassgeo.csiss.gmu.edu/CropCASMA/>
- Data Used
 - Sub Soil Moisture, 9km, Weekly, Year 2021, Week 34, Aug 23-29, 2021
 - Sub Soil Moisture Anomaly, 9km, Weekly, Year 2021, Week 34, Aug 23-29, 2021
 - Sub Soil Moisture Categorical, 9km, Weekly, Year 2021, Week 34, Aug 23-29, 2021
- Total Cropland derived by 2020 Cultivated Layer hosted on Crop-CASMA.



Sub Soil Moisture

- NASA Remotely Sensed Rootzone Soil (sub soil) is defined as the top 3.2 feet (approximately 1 meter).
- The NASA SMAP (Soil Moisture Active Passive) 9km soil moisture measurements are volumetric soil moisture (i.e. volumetric water content in the soil). It is simply the ratio of water volume to soil volume.
- Sub soil moisture measuring at $0.1 \text{ cm}^3/\text{cm}^3$ and below (10% water content) could be considered very dry.

Sub Soil Moisture Anomaly

- The soil moisture anomaly (SMA) in CropCASMA is a measure of deviation of the current soil moisture value from the "normal" soil moisture level, which is represented by a historical average soil moisture value (from 2015 to current).
- The SMA of a given location is defined by the following formula:

$$SMA = \frac{SM - SM_m}{SM_m} \times 100\%$$

where SM and SM_m denote current soil moisture value and the historical average soil moisture value of a given location.

- Soil moisture anomaly below -40% could be considered very abnormal, which means there is 40% less soil moisture than normal conditions.

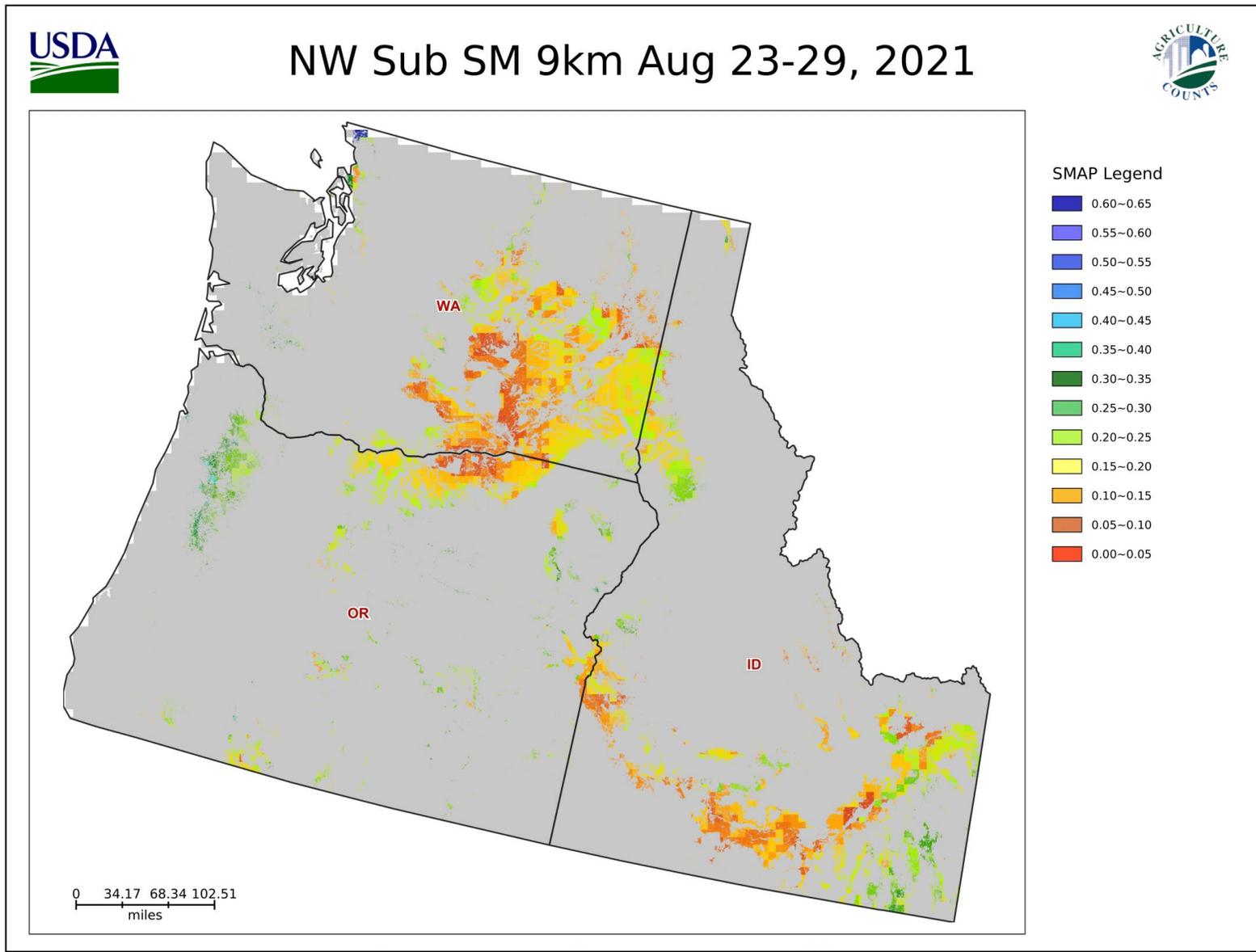
Sub Soil Moisture Categorical

- SMAP values are categorized into NASS categories which include:
 - Very Short - Soil moisture supplies are significantly less than what is required for normal plant development. Growth has been stopped or nearly so and plants are showing visible signs of moisture stress. Under these conditions, plants will quickly suffer irreparable damage.
 - Short - Soil dry. Seed germination and/or normal crop growth and development would be curtailed.
 - Adequate - Soil moist. Seed germination and/or crop growth and development would be normal or unhindered.
 - Surplus - Soil wet. Fields may be muddy and will generally be unable to absorb additional moisture. Young developing crops may be yellowing from excess moisture.



Northwest Region
 Sub Soil Moisture 9km
 Aug 23-29, 2021

Sub Soil Moisture (9km, Aug 23-29, 2021)				
Volumetric Soil Moisture (cm ³ /cm ³)	Northwest Region	Idaho	Oregon	Washington
	Percentage of Total Cropland			
0.0-0.05	5.08%	3.82%	5.86%	5.83%
0.05-0.1	17.66%	18.85%	6.40%	21.92%
0.1-0.15	27.76%	26.50%	21.17%	32.23%
0.15-0.2	34.51%	31.25%	37.54%	35.23%
0.2-0.25	11.67%	16.83%	19.45%	3.87%
0.25-0.3	2.78%	2.75%	7.83%	0.48%
0.3-0.35	0.29%	0.00%	1.28%	0.08%
0.35-0.4	0.10%	0.00%	0.47%	0.00%
0.4-0.45	0.00%	0.00%	0.00%	0.00%
0.45-0.5	0.00%	0.00%	0.00%	0.00%
0.5-0.55	0.00%	0.00%	0.00%	0.00%
0.55-0.6	0.00%	0.00%	0.00%	0.00%
0.6-0.65	0.16%	0.00%	0.00%	0.37%
> 0.65	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%



Produced by VegScope - <http://nassgeodata.gmu.edu/VegScope>

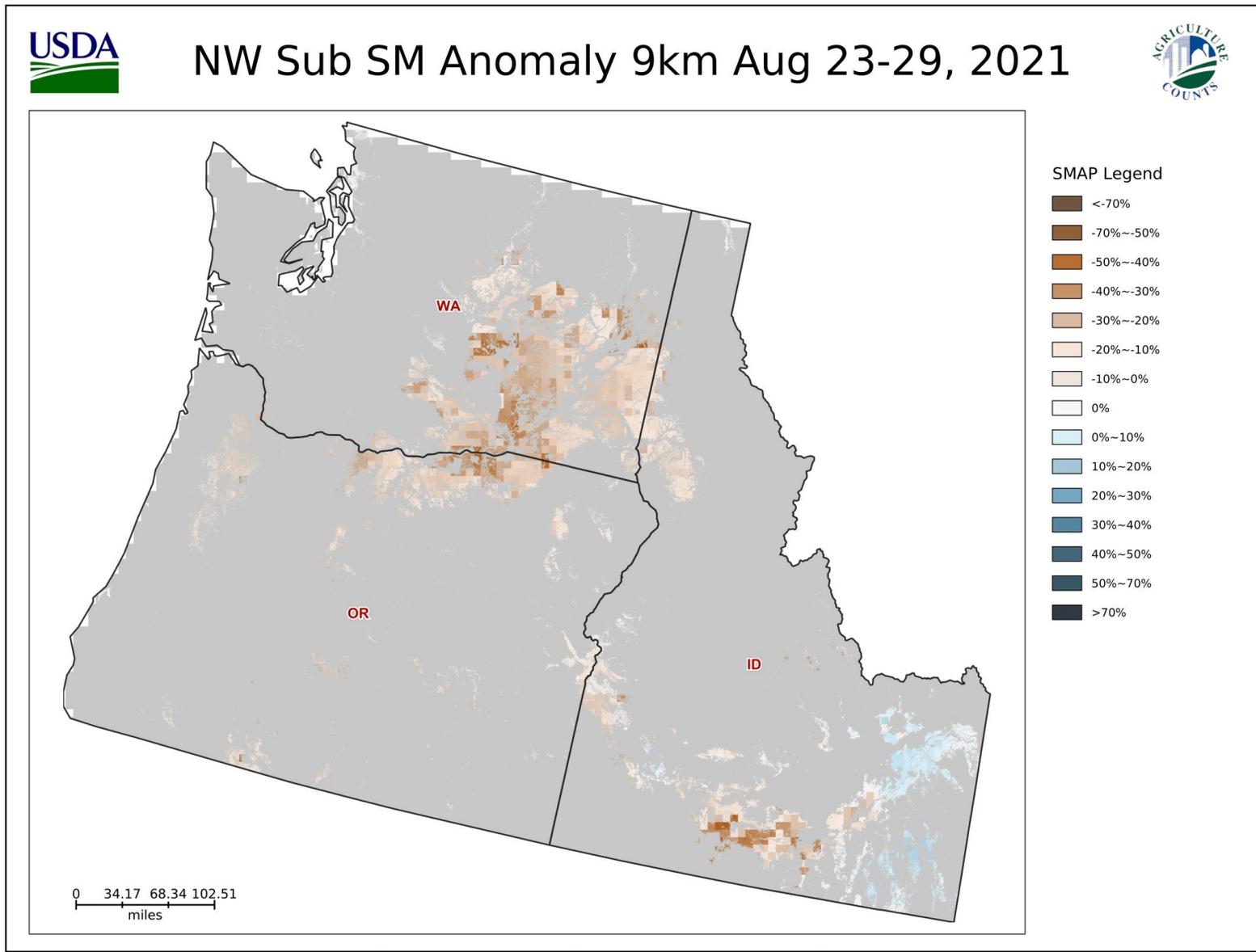


Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



Northwest Region
 Sub Soil Moisture Anomaly 9km
 Aug 23-29, 2021

Sub Soil Moisture Anomaly (9km, Aug 23-29, 2021)				
Soil Moisture Anomaly	Northwest Region	Idaho	Oregon	Washington
	Percentage of Total Cropland			
<-70%	0.00%	0.00%	0.00%	0.00%
-70%~-50%	0.00%	0.00%	0.00%	0.00%
-50%~-40%	0.01%	0.00%	0.07%	0.00%
-40%~-30%	2.33%	2.26%	1.97%	2.59%
-30%~-20%	11.89%	6.34%	9.82%	17.66%
-20%~-10%	45.18%	19.87%	56.77%	60.84%
-10%~0%	27.56%	35.21%	31.38%	18.88%
0%~-10%	9.69%	27.01%	0.00%	0.04%
10%~20%	3.34%	9.32%	0.00%	0.00%
20%~30%	0.00%	0.00%	0.00%	0.00%
30%~40%	0.00%	0.00%	0.00%	0.00%
40%~50%	0.00%	0.00%	0.00%	0.00%
50%~70%	0.00%	0.00%	0.00%	0.00%
>70%	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%

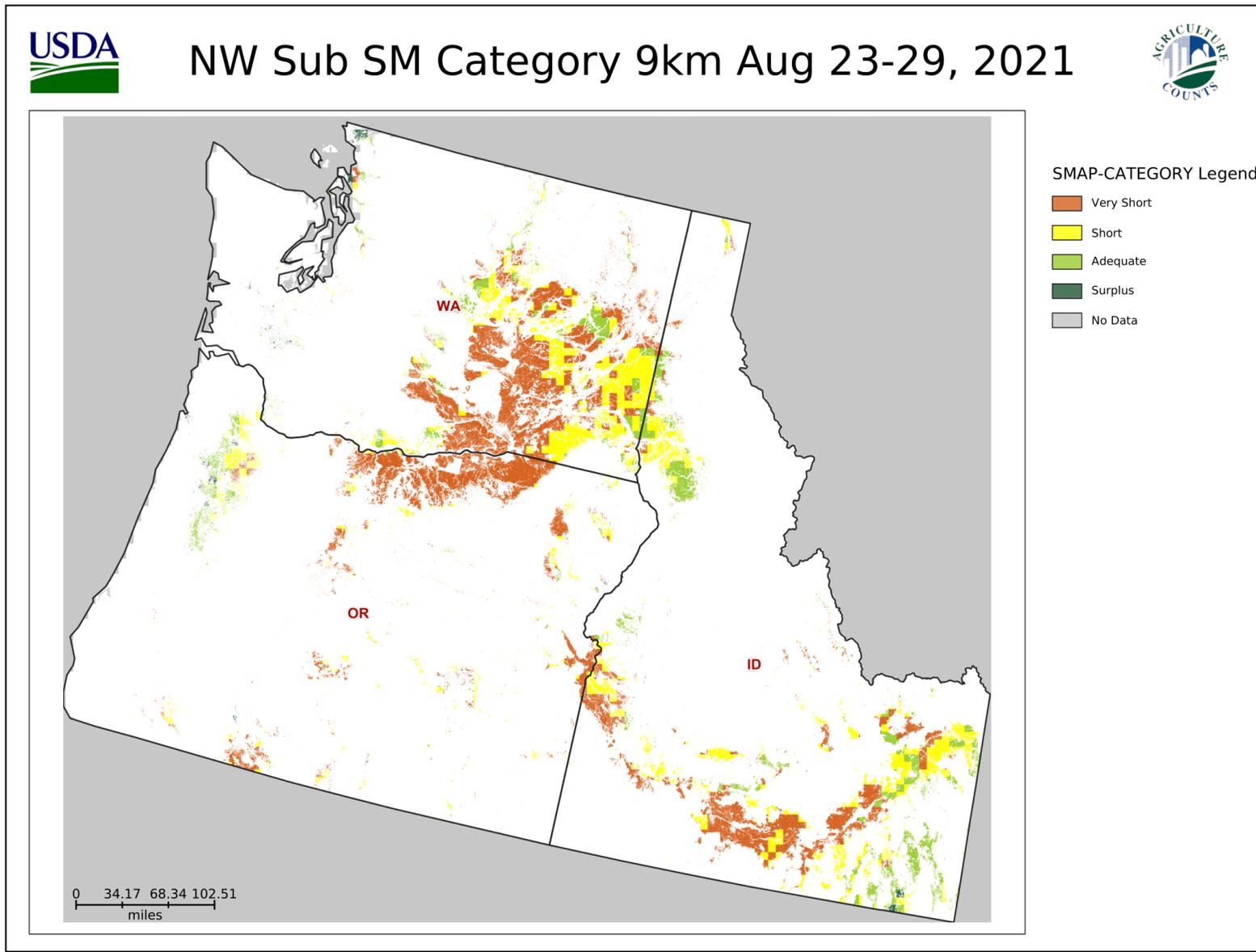


Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



Northwest Region
 Sub Soil Moisture Categorical 9km
 Aug 23-29, 2021

Sub Soil Moisture Categorical (9km, Aug 23-29, 2021)				
Categorical Soil Moisture	Northwest Region	Idaho	Oregon	Washington
	Percentage of Total Cropland			
Very Short	53.49%	39.23%	74.47%	55.80%
Short	30.45%	35.62%	16.25%	32.68%
Adequate	15.14%	24.68%	8.34%	10.22%
Surplus	0.71%	0.47%	0.93%	0.82%
No Data	0.21%	0.00%	0.00%	0.48%
Total	100.00%	100.00%	100.00%	100.00%



Produced by VegScope - <http://nassgeodata.gmu.edu/VegScope>

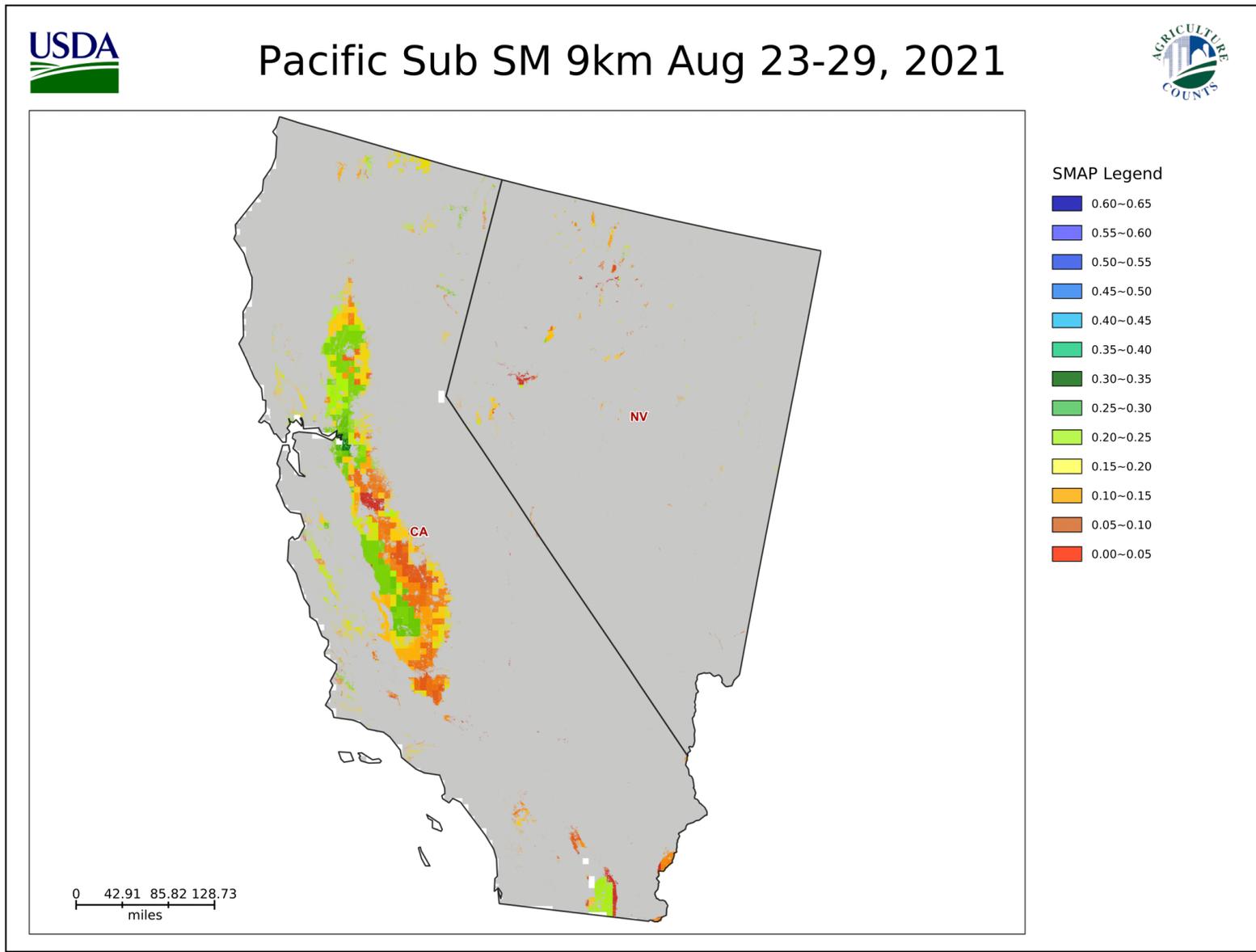


Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



Pacific Region
 Sub Soil Moisture 9km
 Aug 23-29, 2021

Sub Soil Moisture (9km, Aug 23-29, 2021)			
Volumetric Soil Moisture	Pacific Region	California	Nevada
	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
0.0-0.05	8.83%	8.39%	19.28%
0.05-0.1	20.88%	20.89%	19.68%
0.1-0.15	20.88%	20.14%	38.38%
0.15-0.2	19.32%	19.43%	16.84%
0.2-0.25	28.86%	29.89%	5.58%
0.25-0.3	1.07%	1.10%	0.24%
0.3-0.35	0.16%	0.17%	0.00%
0.35-0.4	0.00%	0.00%	0.00%
0.4-0.45	0.00%	0.00%	0.00%
0.45-0.5	0.00%	0.00%	0.00%
0.5-0.55	0.00%	0.00%	0.00%
0.55-0.6	0.00%	0.00%	0.00%
0.6-0.65	0.00%	0.00%	0.00%
> 0.65	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%



Produced by VegScape - <http://nassgeodata.gmu.edu/VegScape>

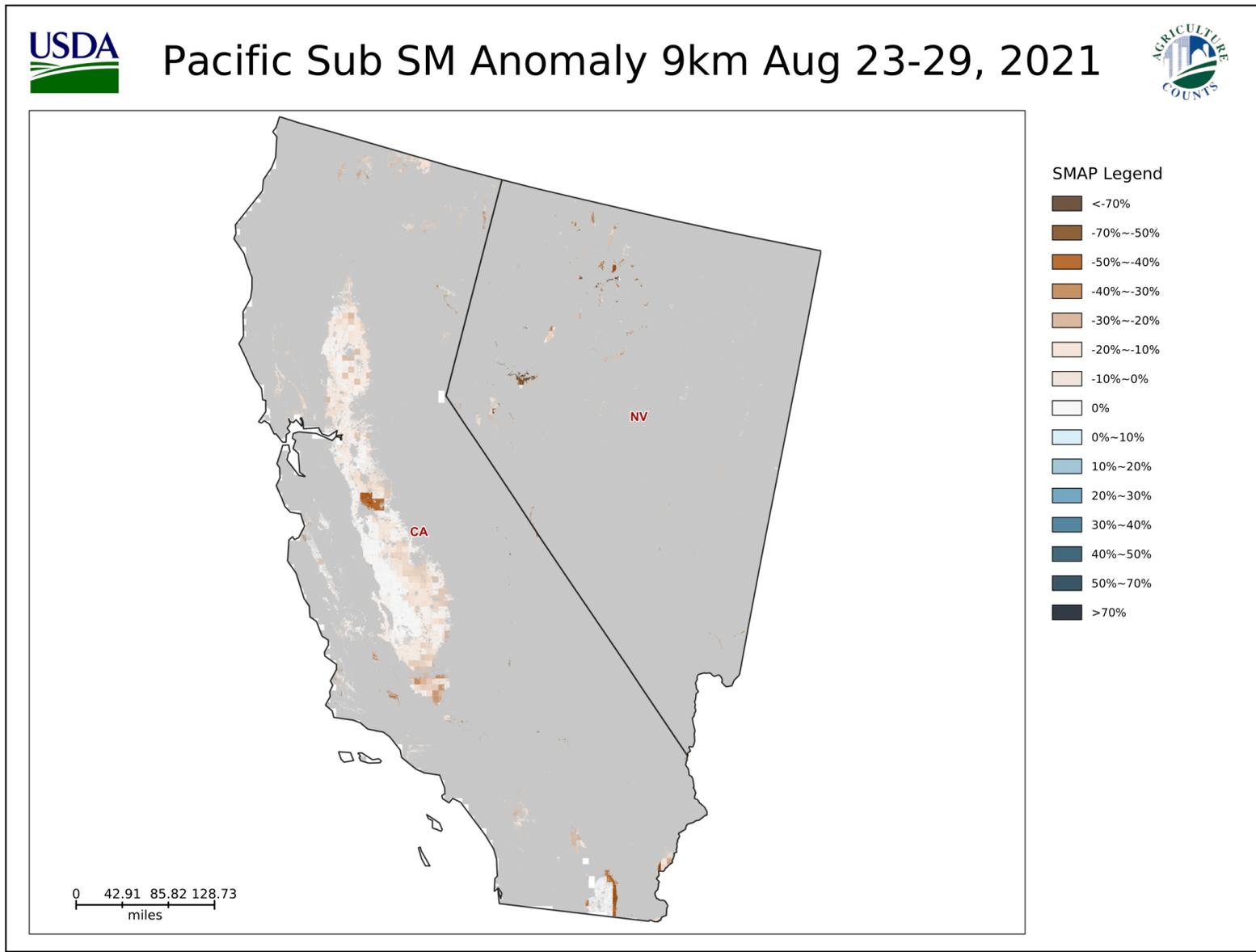


Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



Pacific Region
 Sub Soil Moisture Anomaly 9km
 Aug 23-29, 2021

Sub Soil Moisture Anomaly (9km, Aug 23-29, 2021)			
Soil	Pacific Region	California	Nevada
Moisture Anomaly	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
<-70%	0.02%	0.00%	0.57%
-70%~-50%	0.50%	0.08%	10.30%
-50%~-40%	1.42%	1.03%	10.49%
-40%~-30%	1.93%	1.70%	6.56%
-30%~-20%	2.36%	1.86%	13.47%
-20%~-10%	21.56%	20.99%	34.72%
-10%~0%	64.77%	66.65%	22.28%
0%~-10%	7.44%	7.69%	1.60%
10%~20%	0.00%	0.00%	0.00%
20%~30%	0.00%	0.00%	0.00%
30%~40%	0.00%	0.00%	0.00%
40%~50%	0.00%	0.00%	0.00%
50%~70%	0.00%	0.00%	0.00%
>70%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%

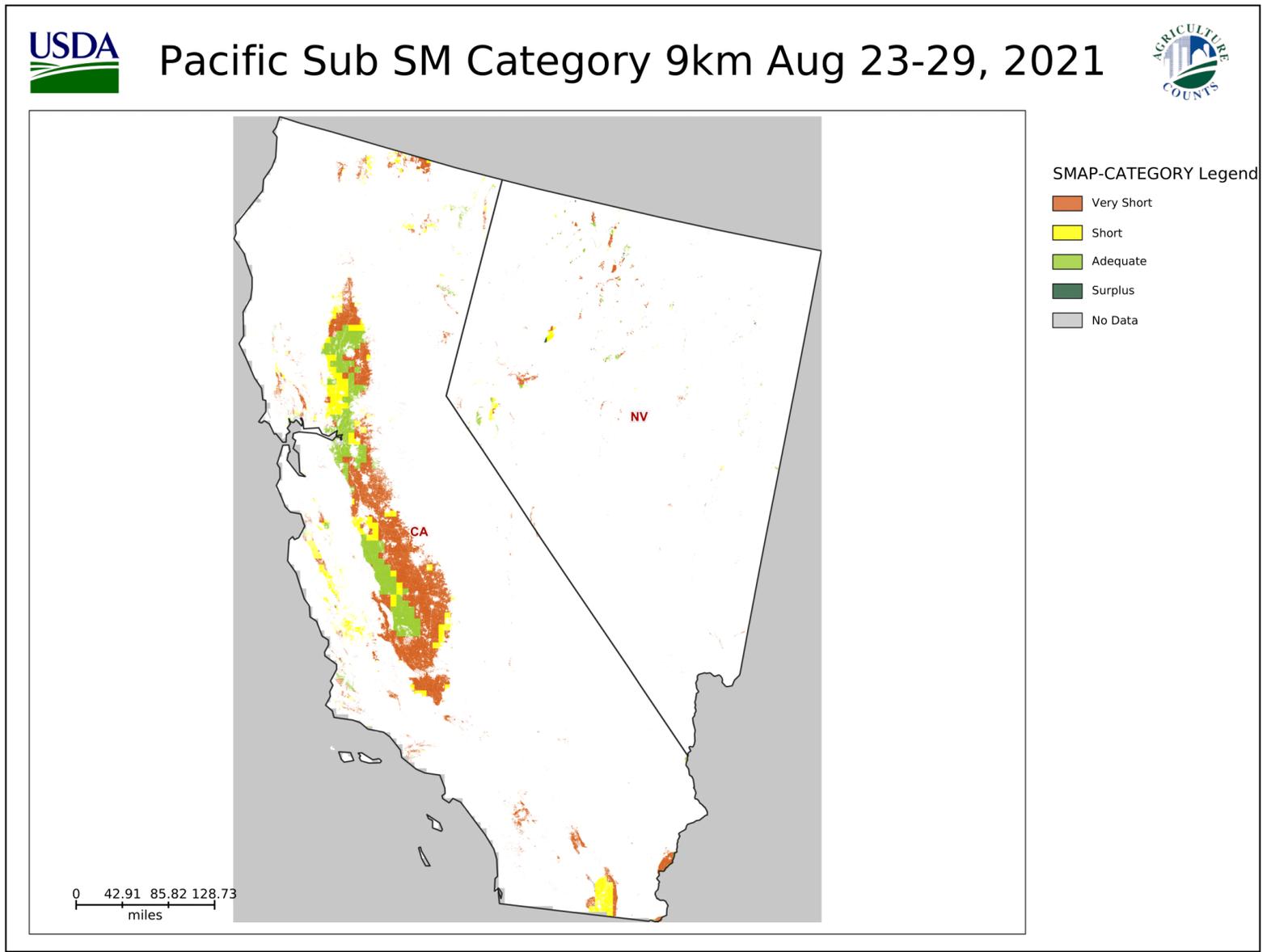


Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



Pacific Region
 Sub Soil Moisture Categorical 9km
 Aug 23-29, 2021

Sub Soil Moisture Categorical (9km, Aug 23-29, 2021)			
Categorical Soil Moisture	Pacific Region	California	Nevada
	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
Very Short	56.97%	57.27%	49.63%
Short	18.35%	18.29%	20.16%
Adequate	24.06%	23.97%	26.26%
Surplus	0.17%	0.01%	3.95%
No Data	0.45%	0.47%	0.00%
Total	100.00%	100.00%	100.00%



Produced by VegScape - <http://nassgeodata.gmu.edu/VegScape>



Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



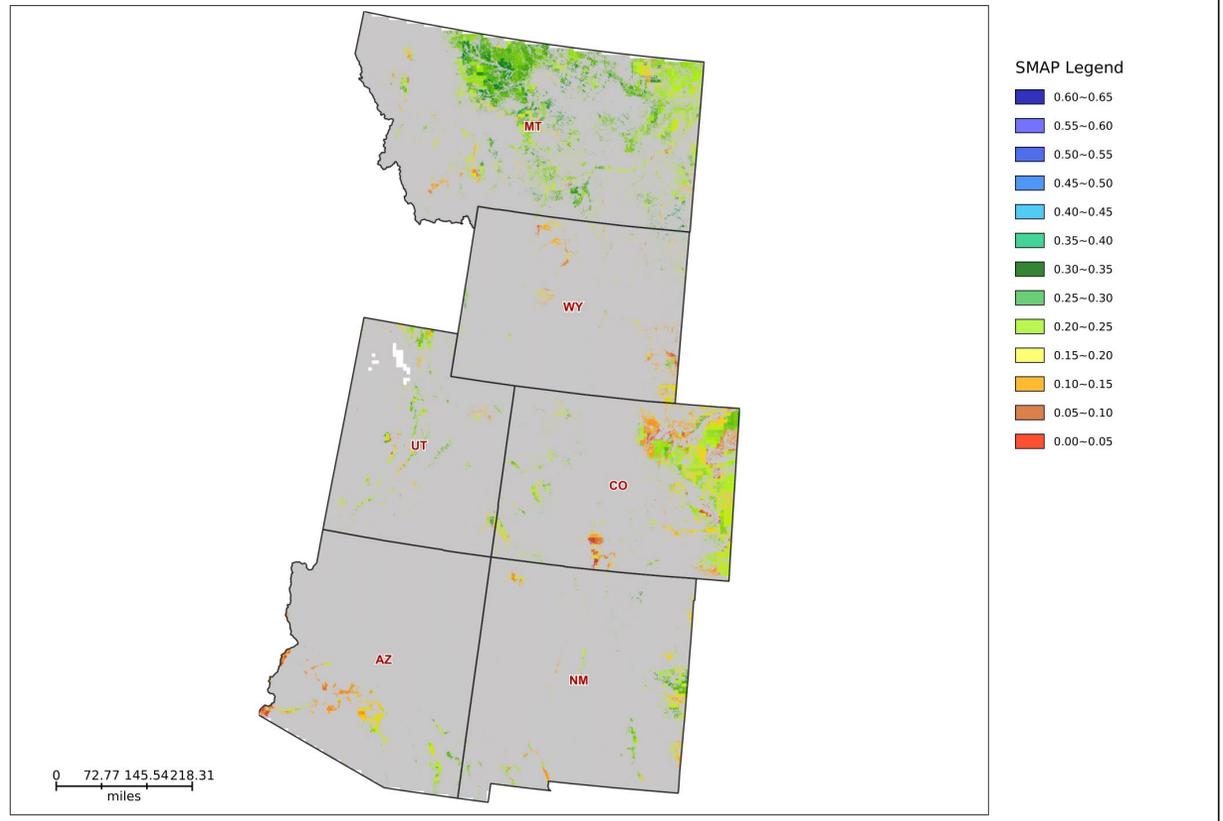
Mountain Region
Sub Soil Moisture 9km
Aug 23-29, 2021



Mountain Sub SM 9km Aug 23-29, 2021



Sub Soil Moisture (9km, Aug 23-29, 2021)							
Volumetric Soil Moisture (cm3/cm3)	Mountain Region	Arizona	Colorado	Montana	New Mexico	Utah	Wyoming
	Percentage of Total Cropland						
0.0-0.05	1.79%	4.18%	4.02%	0.06%	0.04%	1.29%	6.55%
0.05-0.1	5.60%	29.63%	8.82%	1.09%	6.16%	2.59%	8.03%
0.1-0.15	9.74%	18.35%	13.47%	2.45%	17.14%	14.40%	41.09%
0.15-0.2	25.52%	29.85%	39.62%	15.38%	29.33%	30.50%	29.51%
0.2-0.25	36.52%	14.15%	32.87%	43.43%	32.82%	39.85%	11.17%
0.25-0.3	19.65%	3.65%	1.21%	35.33%	14.46%	10.56%	3.28%
0.3-0.35	1.19%	0.19%	0.00%	2.25%	0.04%	0.81%	0.37%
0.35-0.4	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0.4-0.45	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0.45-0.5	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0.5-0.55	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0.55-0.6	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0.6-0.65	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
> 0.65	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total	100.00%						



Produced by VegScape - <http://nassgeodata.gmu.edu/VegScape>



Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



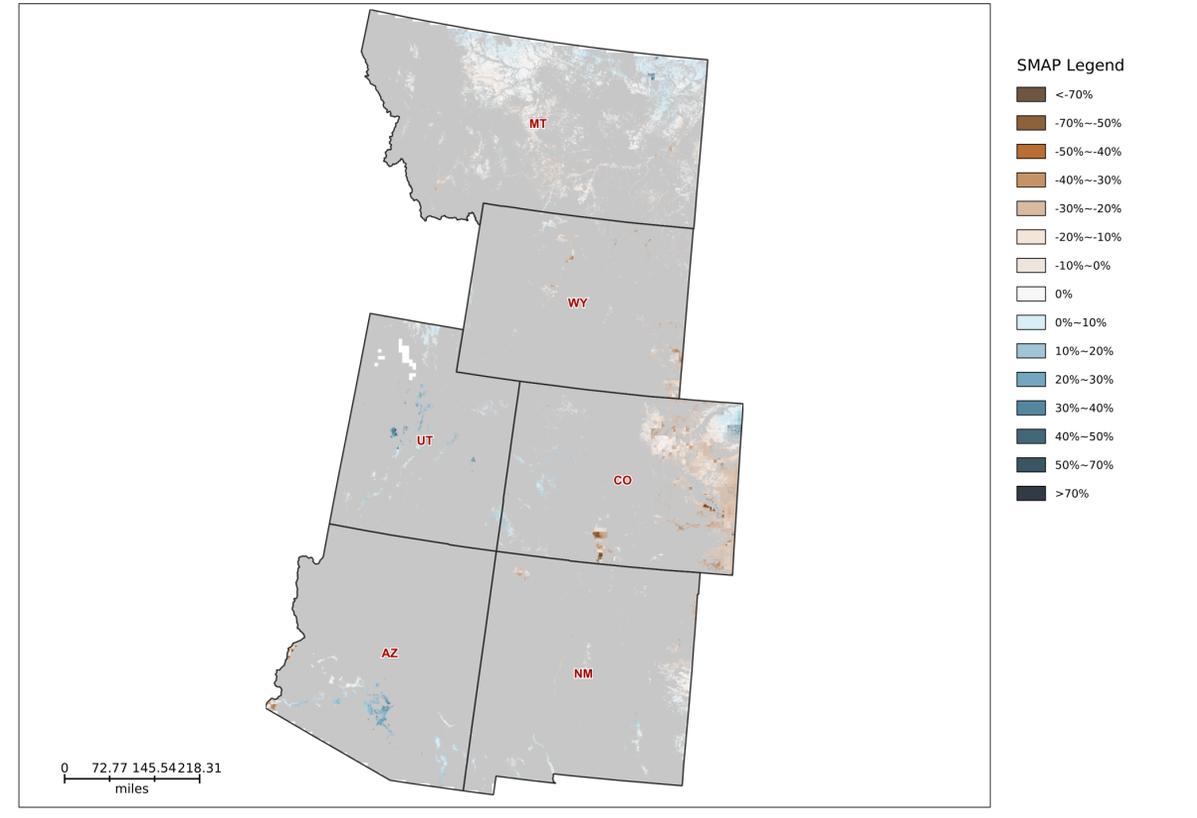
Mountain Region
 Sub Soil Moisture Anomaly 9km
 Aug 23-29, 2021



Mountain Sub SM Anomaly 9km Aug 23-29, 2021



Sub Soil Moisture Anomaly (9km, Aug 23-29, 2021)							
Soil Moisture Anomaly	Mountain Region	Arizona	Colorado	Montana	New Mexico	Utah	Wyoming
	Percentage of Total Cropland						
<-70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
-70%~-50%	0.23%	0.00%	0.75%	0.00%	0.00%	0.00%	0.30%
-50%~-40%	0.39%	0.73%	1.10%	0.00%	0.01%	0.01%	0.43%
-40%~-30%	0.44%	1.85%	0.53%	0.00%	0.25%	0.07%	3.63%
-30%~-20%	2.57%	1.53%	6.87%	0.15%	1.87%	0.14%	6.12%
-20%~-10%	16.91%	4.54%	45.05%	1.68%	12.91%	0.50%	39.65%
-10%~0%	35.39%	12.17%	29.27%	42.94%	41.99%	12.61%	36.20%
0%~10%	35.06%	19.11%	9.80%	53.12%	36.60%	39.26%	13.14%
10%~20%	6.41%	35.72%	5.58%	1.86%	6.28%	30.16%	0.53%
20%~30%	1.96%	22.09%	0.56%	0.05%	0.09%	11.29%	0.00%
30%~40%	0.60%	2.26%	0.48%	0.19%	0.00%	4.81%	0.00%
40%~50%	0.01%	0.00%	0.00%	0.00%	0.00%	0.25%	0.00%
50%~70%	0.04%	0.00%	0.00%	0.00%	0.00%	0.91%	0.00%
>70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total	100.00%						



Produced by VegScape - <http://nassgeodata.gmu.edu/VegScape>



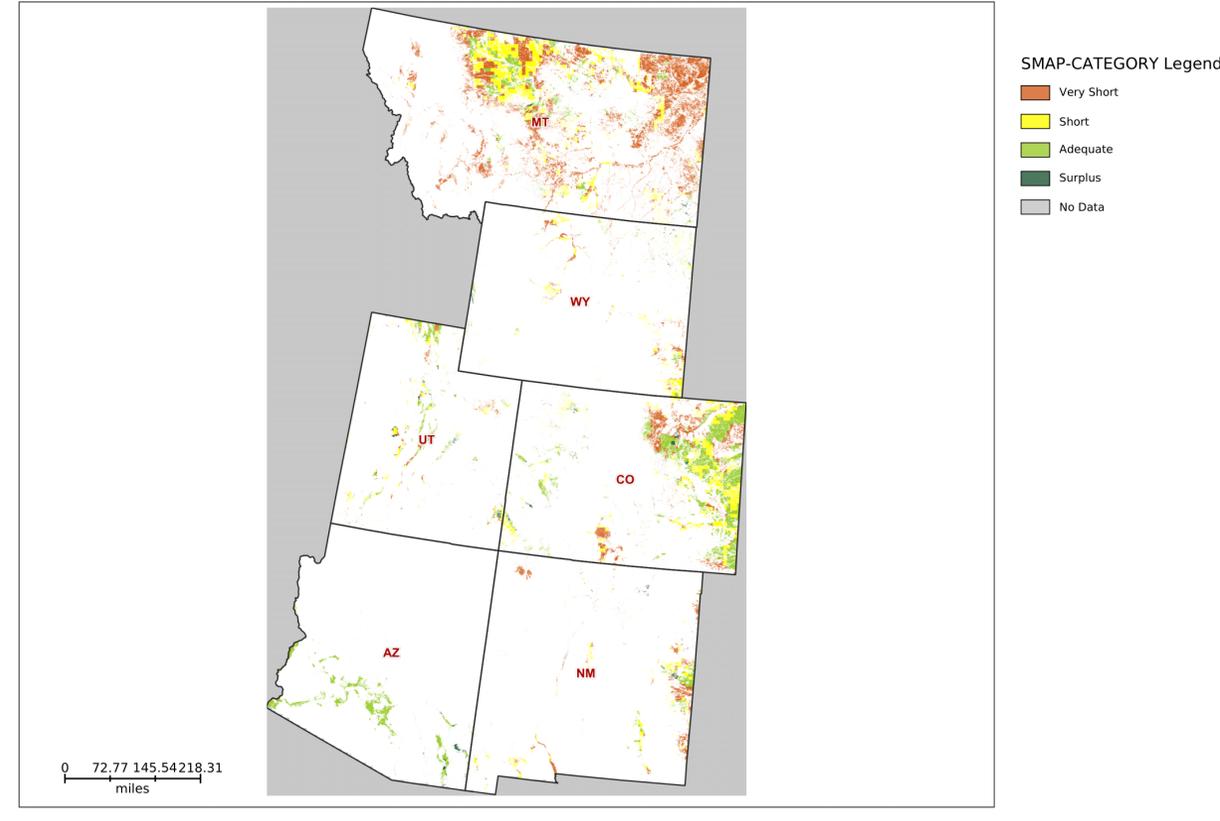
Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



Mountain Region
 Sub Soil Moisture Categorical 9km
 Aug 23-29, 2021



Sub Soil Moisture Categorical (9km, Aug 23-29, 2021)							
Categorical Soil Moisture	Mountain Region	Arizona	Colorado	Montana	New Mexico	Utah	Wyoming
	Percentage of Total Cropland						
Very Short	42.13%	0.00%	21.99%	60.95%	47.41%	20.35%	30.67%
Short	26.70%	0.00%	27.52%	26.10%	31.13%	31.83%	47.92%
Adequate	28.99%	94.32%	49.26%	11.01%	18.68%	42.29%	18.80%
Surplus	1.39%	5.66%	1.23%	0.35%	2.77%	5.47%	2.61%
No Data	0.80%	0.02%	0.00%	1.59%	0.01%	0.06%	0.00%
Total	100.00%						



Produced by VegScape - <http://nassgeodata.gmu.edu/VegScape>

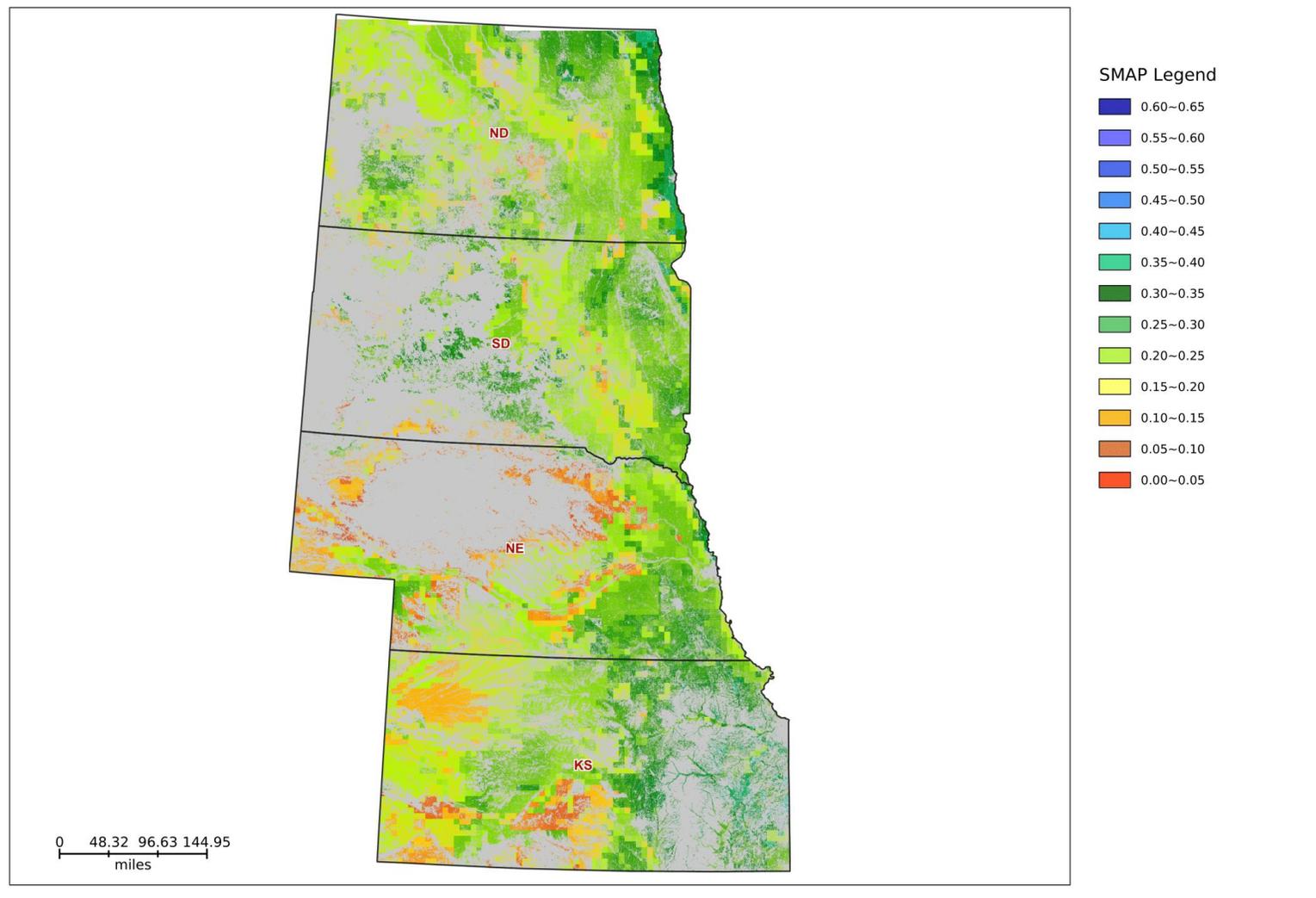


Northern Plains Region
Sub Soil Moisture 9km
Aug 23-29, 2021

Sub Soil Moisture (9km, Aug 23-29, 2021)					
Volumetric Soil Moisture (cm ³ /cm ³)	Northern Plains Region	Kansas	Nebraska	North Dakota	South Dakota
	Percentage of Total Cropland				
0.0-0.05	0.32%	0.09%	1.21%	0.00%	0.07%
0.05-0.1	4.00%	4.31%	11.36%	0.31%	0.29%
0.1-0.15	7.29%	12.56%	9.93%	1.94%	4.00%
0.15-0.2	23.35%	27.79%	16.53%	26.21%	20.85%
0.2-0.25	39.51%	27.02%	40.88%	47.52%	44.82%
0.25-0.3	22.08%	21.76%	19.51%	19.33%	29.19%
0.3-0.35	3.42%	6.35%	0.57%	4.67%	0.77%
0.35-0.4	0.04%	0.13%	0.00%	0.00%	0.00%
0.4-0.45	0.00%	0.00%	0.00%	0.00%	0.00%
0.45-0.5	0.00%	0.00%	0.00%	0.00%	0.00%
0.5-0.55	0.00%	0.00%	0.00%	0.00%	0.00%
0.55-0.6	0.00%	0.00%	0.00%	0.00%	0.00%
0.6-0.65	0.00%	0.00%	0.00%	0.00%	0.00%
> 0.65	0.00%	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%



N.Plains Sub SM 9km Aug 23-29, 2021



Produced by VegScape - <http://nassgeodata.gmu.edu/VegScape>



Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



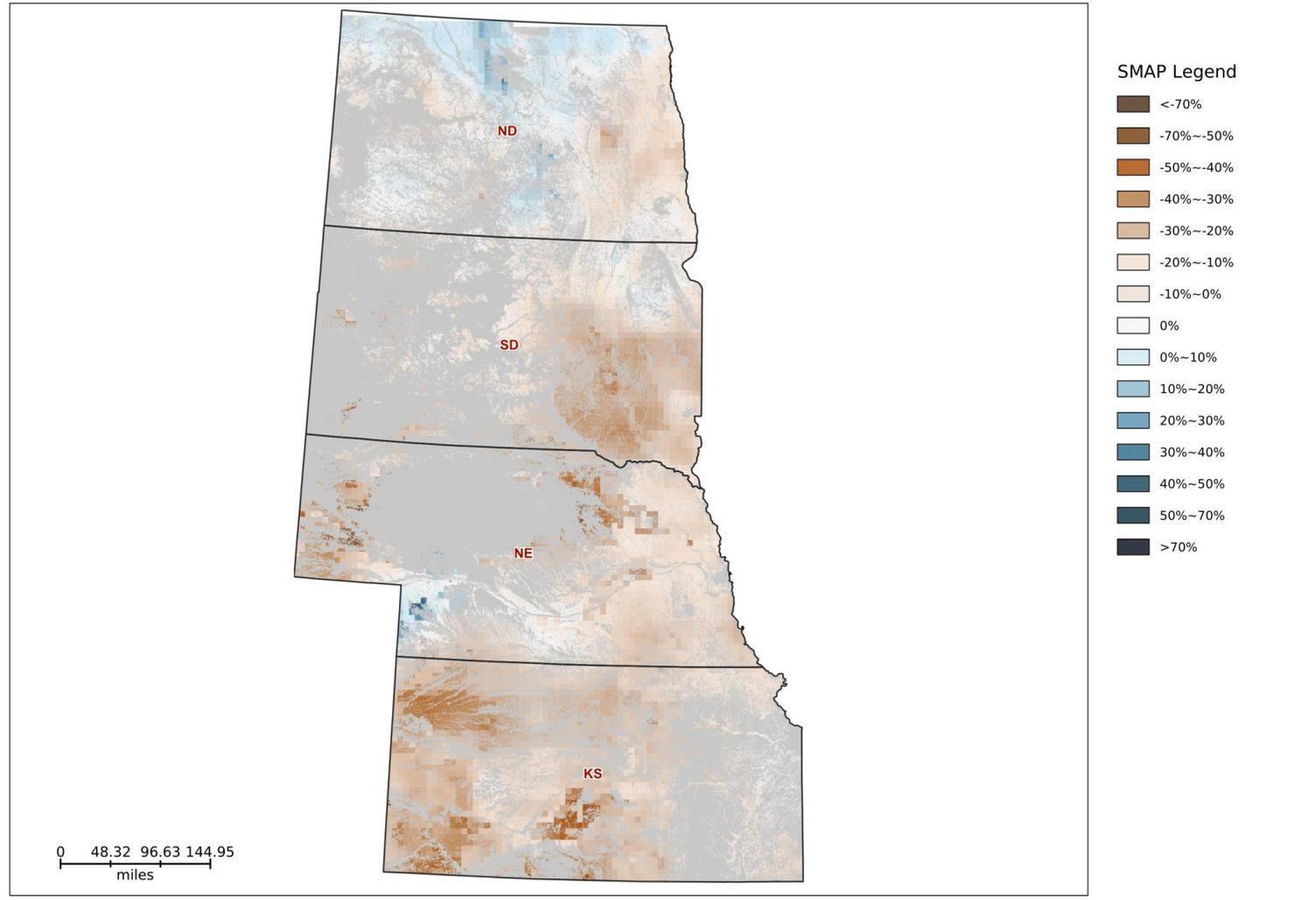
Northern Plains Region
 Sub Soil Moisture Anomaly 9km
 Aug 23-29, 2021



N.Plains Sub SM Anomaly 9km Aug 23-29, 2021



Sub Soil Moisture Anomaly (9km, Aug 23-29, 2021)					
Soil Moisture Anomaly	Northern Plains Region	Kansas	Nebraska	North Dakota	South Dakota
	Percentage of Total Cropland				
<-70%	0.00%	0.00%	0.00%	0.00%	0.00%
-70%~-50%	0.05%	0.02%	0.19%	0.00%	0.00%
-50%~-40%	0.27%	0.43%	0.54%	0.00%	0.11%
-40%~-30%	1.72%	4.22%	1.82%	0.00%	0.43%
-30%~-20%	10.32%	17.83%	6.29%	0.29%	18.06%
-20%~-10%	40.52%	61.85%	48.00%	11.87%	40.78%
-10%~0%	33.28%	15.40%	36.39%	45.98%	37.50%
0%~-10%	11.25%	0.25%	5.01%	34.11%	2.95%
10%~20%	2.17%	0.00%	1.01%	6.88%	0.17%
20%~30%	0.29%	0.00%	0.28%	0.82%	0.00%
30%~40%	0.07%	0.00%	0.28%	0.04%	0.00%
40%~50%	0.04%	0.00%	0.18%	0.00%	0.00%
50%~70%	0.00%	0.00%	0.00%	0.00%	0.00%
>70%	0.00%	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%



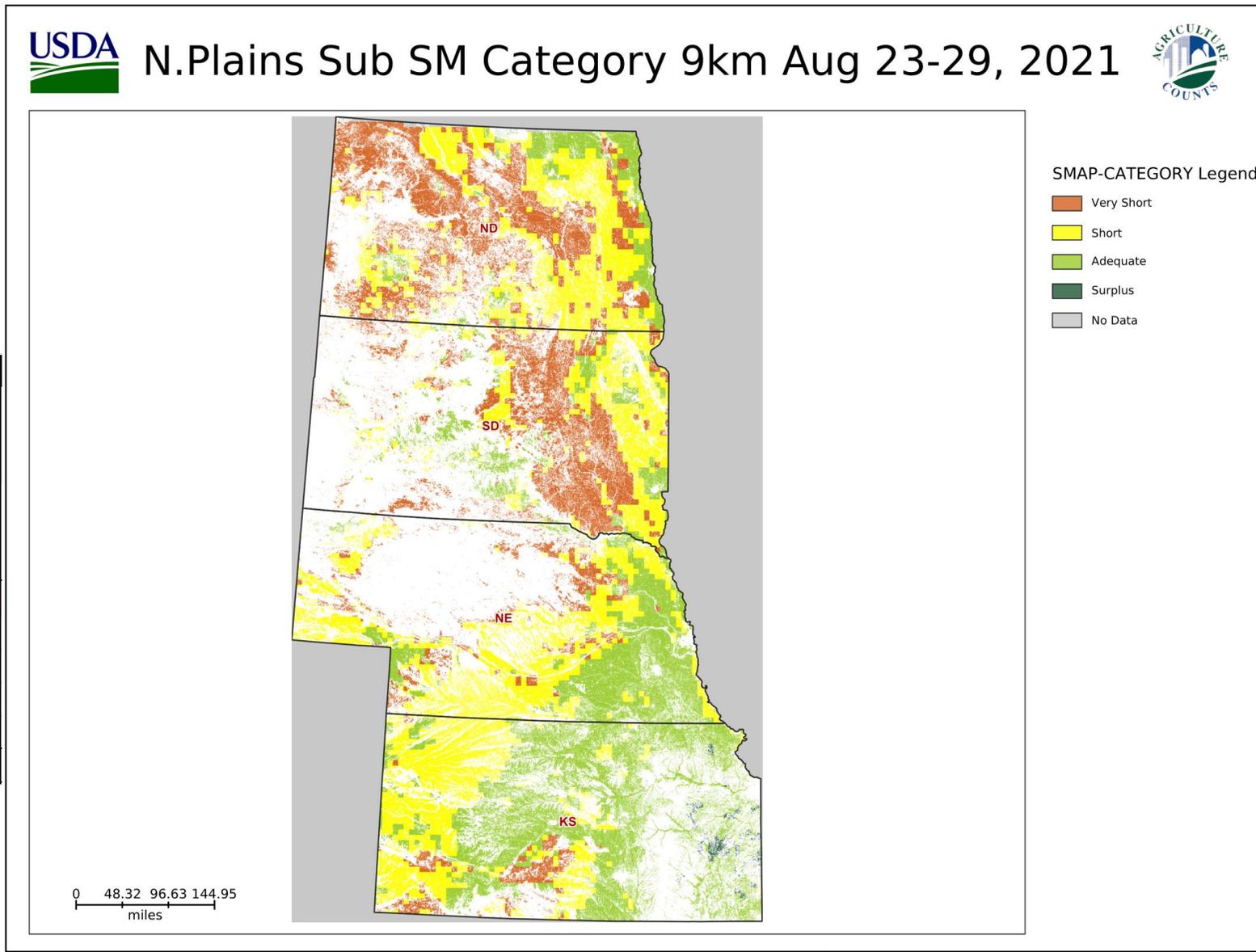
Produced by VegScope - <http://nassgeodata.gmu.edu/VegScope>



Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



Northern Plains Region
 Sub Soil Moisture Categorical 9km
 Aug 23-29, 2021



Sub Soil Moisture Categorical (9km, Aug 23-29, 2021)					
Categorical Soil Moisture	Northern Plains Region	Kansas	Nebraska	North Dakota	South Dakota
	Percentage of Total Cropland				
Very Short	26.10%	5.91%	11.84%	44.15%	46.74%
Short	39.33%	34.88%	46.52%	40.48%	35.76%
Adequate	33.91%	57.87%	41.64%	14.38%	17.50%
Surplus	0.39%	1.35%	0.00%	0.00%	0.00%
No Data	0.28%	0.00%	0.00%	0.99%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%

Produced by VegScape - <http://nassgeodata.gmu.edu/VegScape>

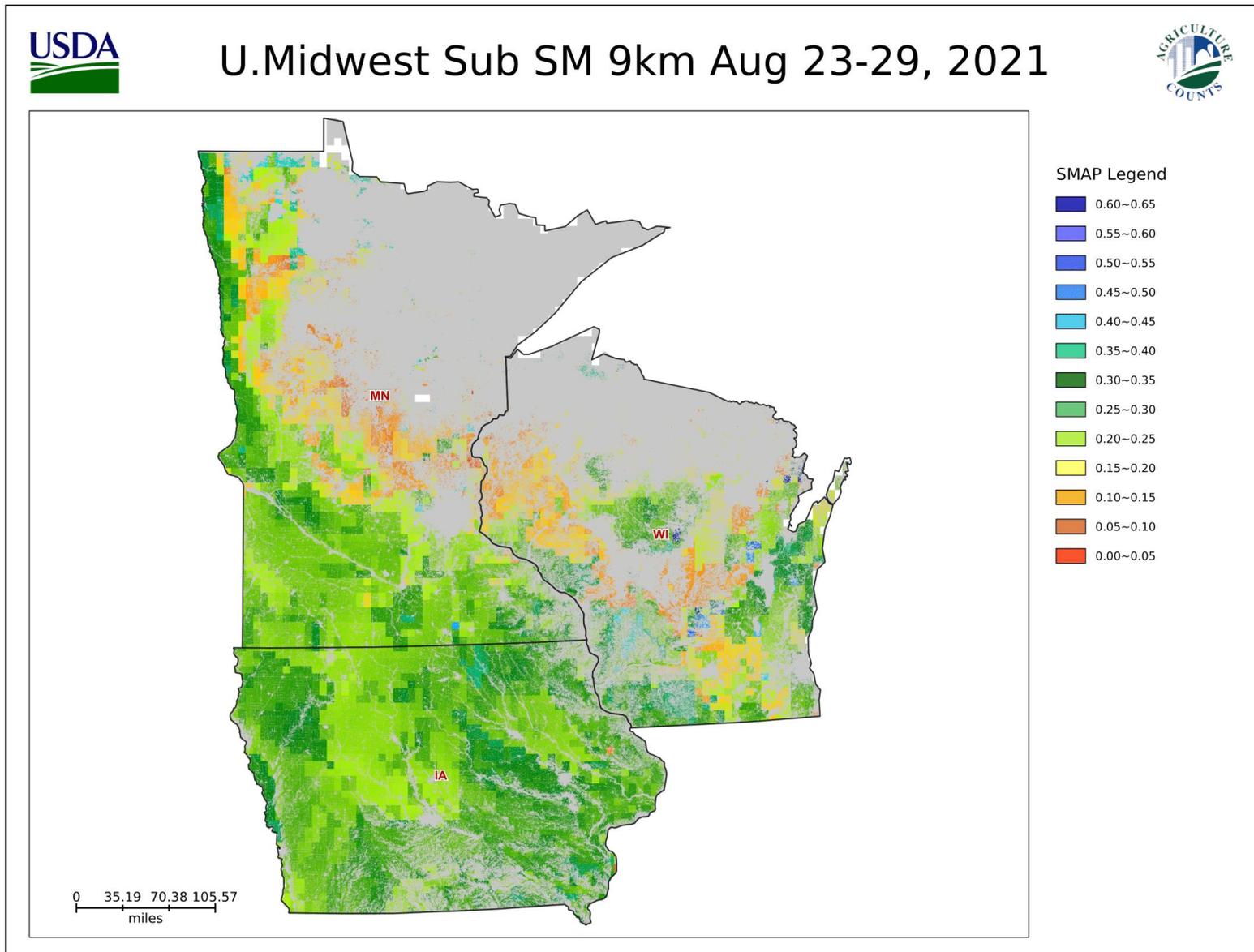


Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>



Upper Midwest Region
Sub Soil Moisture 9km
Aug 23-29, 2021

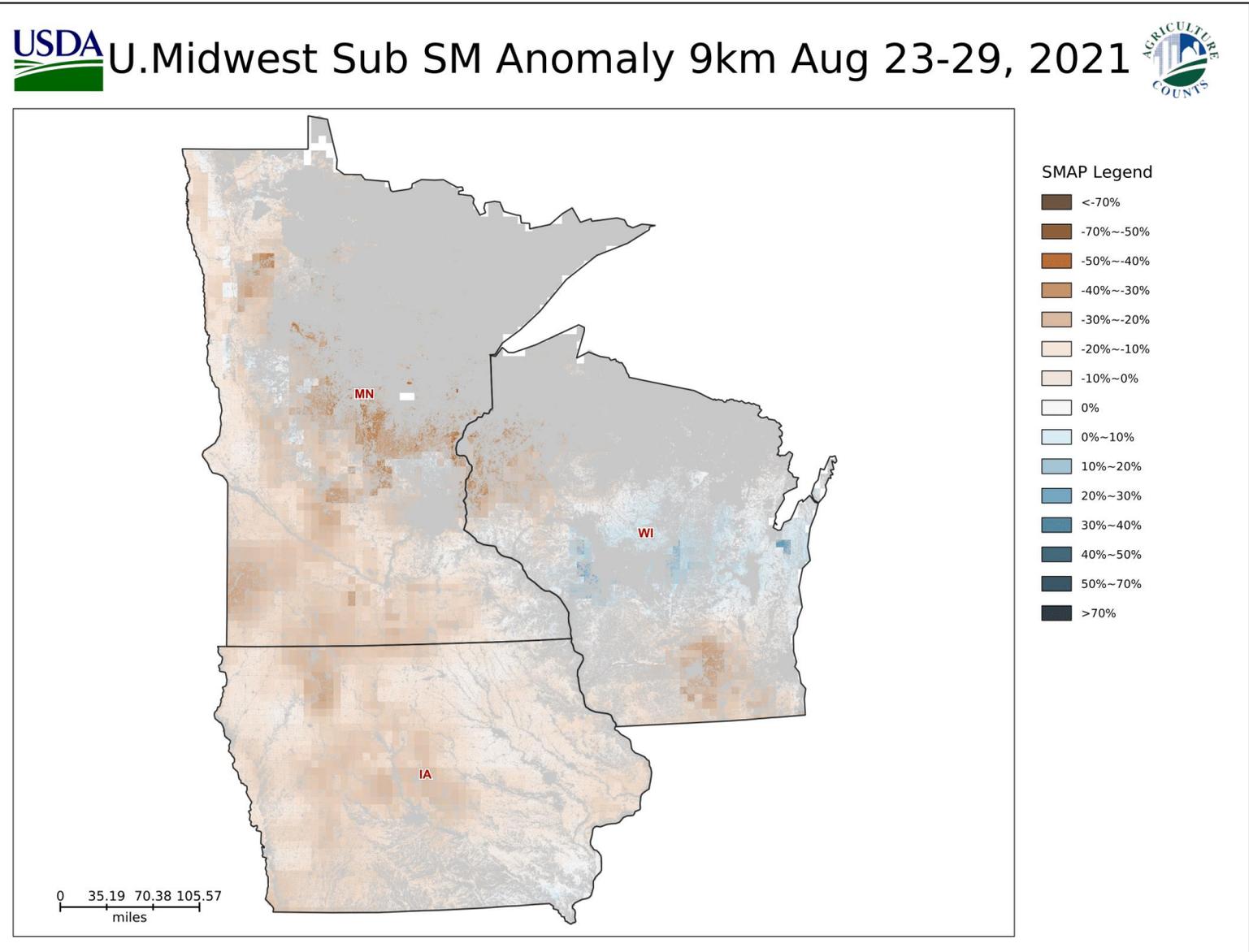
Sub Soil Moisture (9km, Aug 23-29, 2021)				
Volumetric Soil Moisture (cm ³ /cm ³)	Upper Midwest Region	Iowa	Minnesota	Wisconsin
	Percentage of Total Cropland			
0.0-0.05	0.06%	0.00%	0.11%	0.08%
0.05-0.1	2.88%	0.05%	3.91%	8.08%
0.1-0.15	5.89%	0.00%	8.71%	15.23%
0.15-0.2	7.07%	0.05%	11.85%	15.06%
0.2-0.25	38.53%	37.69%	46.15%	23.22%
0.25-0.3	38.36%	55.97%	24.12%	24.05%
0.3-0.35	6.31%	6.25%	3.87%	11.90%
0.35-0.4	0.56%	0.00%	1.19%	0.68%
0.4-0.45	0.04%	0.00%	0.01%	0.20%
0.45-0.5	0.11%	0.00%	0.08%	0.44%
0.5-0.55	0.08%	0.00%	0.00%	0.46%
0.55-0.6	0.06%	0.00%	0.00%	0.35%
0.6-0.65	0.02%	0.00%	0.00%	0.11%
> 0.65	0.02%	0.00%	0.00%	0.14%
Total	100.00%	100.00%	100.00%	100.00%



Produced by VegScope - <http://nassgeodata.gmu.edu/VegScope>

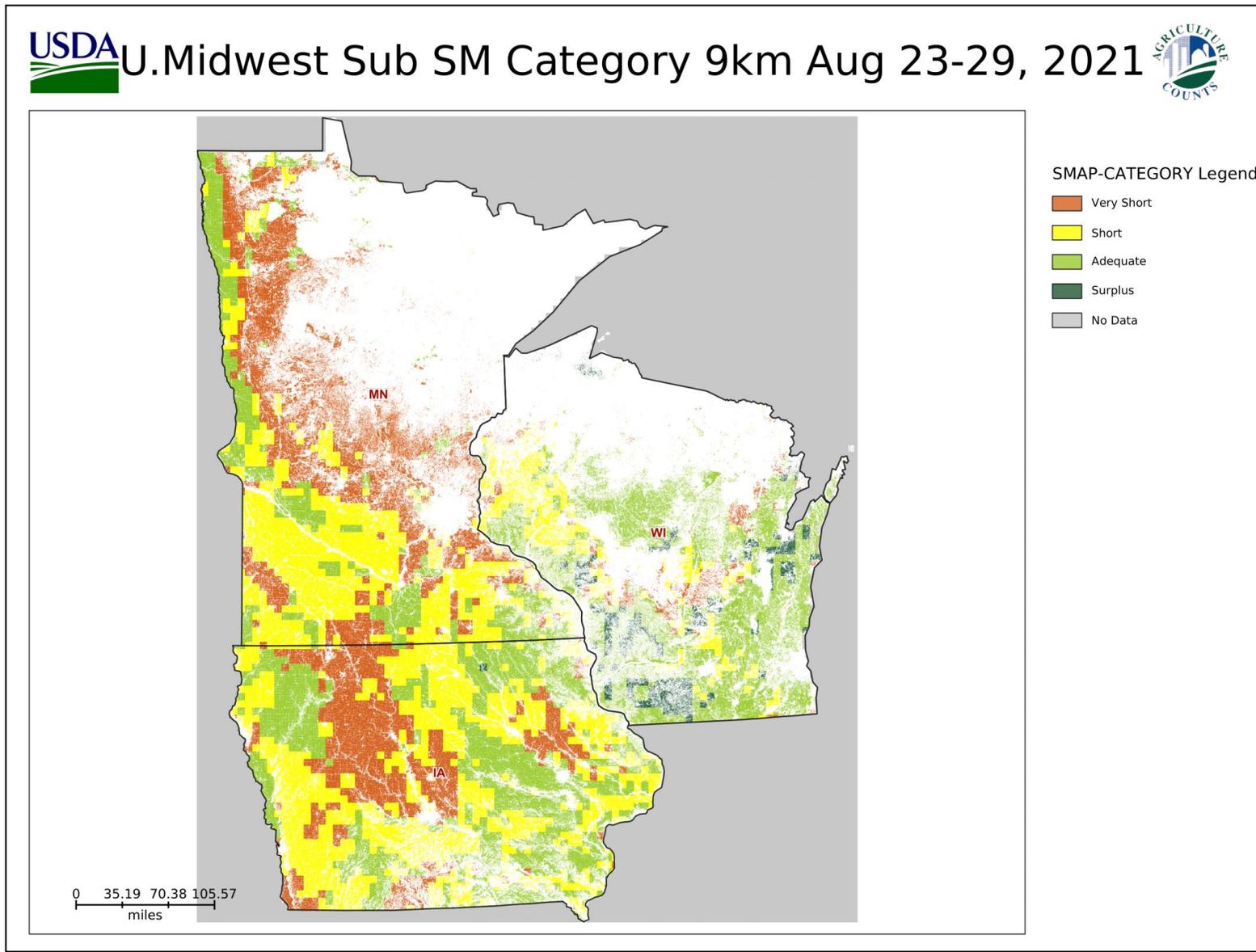
Upper Midwest Region
 Sub Soil Moisture Anomaly 9km
 Aug 23-29, 2021

Sub Soil Moisture Anomaly (9km, Aug 23-29, 2021)				
Soil Moisture Anomaly	Upper Midwest Region	Iowa	Minnesota	Wisconsin
	Percentage of Total Cropland			
<-70%	0.00%	0.00%	0.00%	0.00%
-70%~-50%	0.00%	0.00%	0.00%	0.00%
-50%~-40%	0.03%	0.00%	0.04%	0.07%
-40%~-30%	0.43%	0.00%	1.03%	0.19%
-30%~-20%	3.35%	0.08%	6.22%	5.66%
-20%~-10%	49.50%	49.27%	60.34%	25.54%
-10%~0%	38.10%	49.31%	29.19%	28.92%
0%~-10%	7.27%	1.34%	3.17%	31.91%
10%~20%	1.13%	0.00%	0.00%	6.61%
20%~30%	0.16%	0.00%	0.00%	0.96%
30%~40%	0.03%	0.00%	0.00%	0.15%
40%~50%	0.00%	0.00%	0.00%	0.00%
50%~70%	0.00%	0.00%	0.00%	0.00%
>70%	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%



Upper Midwest Region
 Sub Soil Moisture Categorical 9km
 Aug 23-29, 2021

Sub Soil Moisture Categorical (9km, Aug 23-29, 2021)				
Categorical Soil Moisture	Upper Midwest Region	Iowa	Minnesota	Wisconsin
	Percentage of Total Cropland			
Very Short	27.15%	24.64%	40.03%	5.36%
Short	36.32%	40.94%	39.15%	17.82%
Adequate	34.66%	34.37%	20.76%	66.21%
Surplus	1.79%	0.06%	0.00%	10.29%
No Data	0.08%	0.00%	0.07%	0.31%
Total	100.00%	100.00%	100.00%	100.00%



Produced by VegScape - <http://nassgeodata.gmu.edu/VegScape>



Crop-CASMA: <https://nassgeo.csiss.gmu.edu/CropCASMA/>

